Course Policy

Department	Information Technology
Faculty	Computer Science
Course Code	
Course Title	Advanced Networking
Credit hour	3
Pre-Requisite	Data Comm and Computer Networking
Course Instructor	Baitullah Malakhil
Text Book	CCNA Routing and Switching Study Guide - Lammle, Todd
Reference Book	CCNA Routing and Switching Study Guide - Lammle, Todd

1. Course Description:

This course is designed to equip the students with the basic knowledge of IP addressing & IPv4 submitting, Cisco Switch & Router Operations, static routing, default routing, dynamic routing, routing protocols such as RIP, IGRP, EIGRP, OSPF, VLAN & VTP, switch functions & STP, Access Control List and NAT. The course will enable the students to practically work with the above mentioned protocols and services on Cisco devices.

2. Course Learning Objectives (CLO):

1. Knowledge of IPv4 and IPv4 sub netting
2. Knowledge of hub, switch and router operations
3. Theoretical and practical knowledge of types of routing including static routing, default routing and dynamic routing.
4. Practical and theoretical skills knowledge of different dynamic routing protocols (i.e. RIP, EIGRP & OSPF) and the classification of routing protocols
5. Layer 2 loops or Switch loops prevention using the STP (spanning tree algorithm)
6. Breaking down a large physical switched network into many smaller logical network using VLAN & VTP technologies.

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7. Restricted access to devices or networks using different types of ACLs.
8. Using NAT to translate private IP into public and vice versa.

3. Learning Domain:

- Cognitive (knowledge)
- Affective (Attitude)
- Psychomotor (Physical or Manual skills)

Only cognitive domain is used for this course while the rest two cannot applied here

4. Course Learning Objectives Mapping with Bloom Taxonomy:

1) Remembering
2) Understanding
3) Applying
4) Analyzing
5) Evaluating
6) Creating

COLs	1	2	3	4	5	6
CLO1	True	True	True			
CLO2		True				
CLO3		True	True			
CLO4	True	True	True			
CLO5		True	True			
CLO6		True	True			
CLO7		True	True			
CLO8		True	True			

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5. Course Teaching Methods

1	Lecture
2	Problem solving Learning
3	Interactive Learning
4	Practical sessions

6. Grading Scheme

Mid Term	20%
Assignments	10%
Quiz	10%
Final Term	60%

7. Weekly Course Breakdown:

Week	Topic	Objectives	Activities	Assessment	
1	Introduction of the course: - Introduction to the course - Introduction to network & internetwork - Introduction to Cisco Courses: - Broadcast domain	-Understanding the course outline and objectives -Understanding Hub, Switch, Router and their operations -Understanding	-Q&A session with students	Oral assessment at class	

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	and collision domain - Hub operation - Switch operation - Router operation	the broadcast and collision domains.			
2	**Introduction to IP, sub-netting & VLSM** - IPv4 & its classes - APIPA & Loopback IP - Private & Public IP - VLSM - Sub-netting IPv4 - Subnet mask notations -	-Understanding IPv4 addresses in details -Sub netting of classes A, B and C of IPv4 - VLSM and subnet mask	- Sub netting practice using pen and notebook at class - Sub netting Team work at class	Oral assessment at class	
3	**Cisco IOS, Accessing Cisco Router/Switch, Router/Switch Boot Process & Cisco Router Modes:** - Cisco ISO - Accessing Router/Switch by multiple methods - Router or switch boot process - Cisco router modes - CDP -	-Understanding and working with CDP. -Understanding IOS and its functionalities	-Q&A session with students	Oral assessment at class	
4	**Telnet & SSH:** - Introduction to Telnet and SSH - telnet configuration and verification - SSH configuration and verifications	Practical and theoretical knowledge and skills of Telnet and SSH	-Q&A session with students	Oral assessment at class	

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	- **COMPUTER LAB (STUDENTS PRACTICE)**				
5	**Routing** - Static routing - Default routing - Dynamic routing - Pros and cons of static routing - Link-state routing protocols - Distance vector routing protocols - Hybrid routing protocols - AD value - Metric	-Understanding routing, different types of routing. -Understanding different types of routing protocols	-Q&A session with students	Oral assessment at class	
6	**Static Routing & Default Routing:** - Configuration of static routing - Configuration of default routing - Trouble shooting of static and default routing - Verification commands for static and default routing - **COMPUTER LAB (STUDENTS PRACTICE)**	- Implementation of Static and default routing in a sample internetwork environment	-Practical session with students	Oral assessment at class	
7	**RIPv1 & RIPv2:** - Detailed description of the RIP	-Understanding RIPv1 and RIPv2	-Practical session with students	Oral assessment at class	

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	- Difference between RIPv1 and RIPv2 - RIPv1 and RIPv2 configuration - Troubleshooting and verification of RIPv1 and RIPv2 - **COMPUTER LAB (STUDENTS PRACTICE)**	-Practical work of RIP			
8	**IGRP & EIGRP:** - Detailed description of IGRP - Detailed description of EIGRP - Difference between IGRP & RIP - EIGRP configuration - EIGRP troubleshooting and verification - **COMPUTER LAB (STUDENTS PRACTICE)**	-Understanding IGRP and EIGRP -Working with EIGRP	-Practical session with students	Oral assessment at class	
9	**OSPF:** - Detailed description of OSPF - DR & BDR operations - Setting RID - Configuration of OSP - Troubleshooting and verification of OSPF - **COMPUTER LAB (STUDENTS PRACTICE)**	-Understanding OSPF -Working with OSPF	-Practical session with students	Oral assessment at class	

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10	**Switching, STP & switch-port Security** - Switch operations - Switch functions - Introduction to STP - Root bridge and Non-root bridge - Designated and non-designated ports - Switch priority - Managing STP - Working with switch-port security - **COMPUTER LAB (STUDENTS PRACTICE)**	-Understanding STP -Working with STP	-Practical session with students	Oral assessment at class	
11	**VLAN** - Introduction to VLAN - VTP - VTP Domain - VTP Modes - Frames tagging - Frame tagging protocols o ISL o Dot1Q - Access and trunk ports	-Understanding VLAN and VTP	-Practical session with students	Oral assessment at class	
12	**VLAN & Inter-VLAN configuration** - Inter-VLAN routing using: o Using multiple links o Using router	-Working with VLAN and VTP -Inter-VLAN routing	-Practical session with students	Oral assessment at class	

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	on-stick - Configuration of VLAN and inter-VLAN routing Troubleshooting and verification of VLAN **COMPUTER LAB (STUDENTS PRACTICE)**				
13	**ACL** - Standard ACL - Extended ACL - Named ACL - ACL Configuration - ACL verification - **COMPUTER LAB (STUDENTS PRACTICE)**	-Understanding ACL -Working with ACL	-Practical session with students	Oral assessment at class	
14	**NAT** - NAT - PAT - Static NAT - Configuration of PAT using ACL - Verification of PAT - **COMPUTER LAB (STUDENTS PRACTICE)**	-Understanding NAT -Working with NAT	-Practical session with students	Oral assessment at class	
15	**Working with IPv6:** - Introduction to IPv6 - Assigning IPv6 to routers - Routing using IPv4 - **COMPUTER LAB (STUDENTS**				

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	PRACTICE)				
16	**Overall Review & Quiz:** - Overall review of the lectures - QUIZ	-Revision	-Discussion with students	Oral assessment at class	